RoHS
Available on commercial versions

VOIDLESS HERMETICALLY SEALED ULTRAFAST RECOVERY GLASS RECTIFIERS

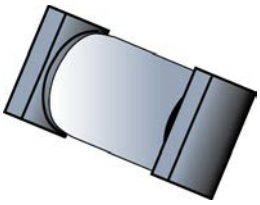
Qualified per MIL-PRF-19500/477

Qualified Levels:
JAN, JANTX, JANTXV and JANS

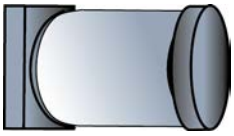
DESCRIPTION

This "Ultrafast Recovery" rectifier diode series is military qualified and is ideal for high-reliability applications where a failure cannot be tolerated. The industry-recognized 2.5 amp rated rectifiers with working peak reverse voltages from 50 to 150 volts are hermetically sealed with voidless glass construction using an internal *"Category 1"* metallurgical bond. These devices are available in both surface mount MELF and leaded package configurations. Microsemi also offers numerous other rectifier products to meet higher and lower current ratings with various recovery time requirements including standard, fast and ultrafast device types in both through-hole and surface mount packages.

Important: For the latest information, visit our website http://www.microsemi.com.



"A" or D-5A Package (US)



"A" Package (URS)

FEATURES

- JEDEC registered surface mount equivalent of1N5802, 1N5804, 1N5806 series.
- Voidless hermetically sealed glass package.
- Quadruple-layer passivation
- Extremely robust construction.
- Internal *"Category 1"* metallurgical bonds.
- JAN, JANTX, JANTXV and JANS qualifications are available per MIL-PRF-19500/477.
- RoHS compliant versions available (commercial grade only).

APPLICATIONS / BENEFITS

- Ultrafast recovery 2.5 amp rectifier series from 50 to 150 V.
- Military, space and other high-reliability applications.
- Switching power supplies or other applications requiring extremely fast switching & low forward loss.
- High forward surge current capability.
- Low thermal resistance.
- Controlled avalanche with peak reverse power capability.
- Inherently radiation hard as described in Microsemi MicroNote 050.

Also available in:

"A" Package
(axial-leaded)
1N5802, 04 and 06

MAXIMUM RATINGS @ T_A= 25°C unless otherwise specified

Parameters/Test Conditions	Symbol	Value	Unit
Junction and Storage Temperature	T_J and T_{STG}	-65 to +175	°C
Thermal Resistance Junction-to-End Cap (see Figure 1)	$R_{\Theta JEC}$	13	°C/W
Working Peak Reverse Voltage: 1N5802US & URS 1N5804US & URS 1N5806US & URS	V_{RWM}	50 100 150	V
Forward Surge Current (3)	I_{FSM}	35	A
Average Rectified Output Current @ T_{EC} = +75 °C (1)	I_{O1}	2.5	A
Average Rectified Output-Current @ T_A = +55 °C (2)	I_{O2}	1.0	A
Capacitance @ V_R = 10 V, f = 1 MHz; Vsig = 50 mV (p-p)	C	25	pF
Reverse Recovery Time (4)	t_{rr}	25	ns
Solder Temperature @ 10 s	T_{SP}	260	°C

Notes:
1. I_{O1} is rated at 2.5 A @ T_{EC} = 75 °C. Derate at 50 mA/°C for T_{EC} above 125 °C.
2. I_{O2} is rated at 1.0 A @ T_A = 55 °C for PC boards where thermal resistance from mounting point to ambient is sufficiently controlled ($R_{\Theta JX} \leq$ 154 °C/W) where $T_{J(max)}$ 175 °C is not exceeded. Derate at 8.33 mA/°C for T_A above 55 °C.
3. T_A = 25 °C @ I_O = 1.0 A and V_{RWM} for ten 8.3 ms surges at 1 minute intervals.
4. I_F = 0.5 A, I_{RM} = 0.5 A, $I_{R(REC)}$ = .05 A.

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MECHANICAL and PACKAGING

- CASE: Hermetically sealed voidless hard glass with tungsten slugs.
- TERMINALS: Tin/lead (Sn/Pb) or RoHS compliant matte/tin (commercial grade only) over nickel plate over copper.
- MARKING: Body painted and part number.
- POLARITY: Cathode indicated by band.
- TAPE & REEL option: Standard per EIA-481-B. Consult factory for quantities.
- WEIGHT: 193 milligrams.
- See Package Dimensions on last page.

PART NOMENCLATURE

JAN 1N5802 US (e3)

Reliability Level
JAN = JAN Level
JANTX = JANTX Level
JANTXV = JANTXV Level
JANS = JANS Level
Blank = Commercial

JEDEC type number
(See Electrical Characteristics table)

RoHS Compliance
e3 = RoHS compliant (available on commercial grade only)
Blank = non-RoHS compliant

Surface Mount package type
US = 2 Square end caps
URS = 1 Square + 1 Round end cap

SYMBOLS & DEFINITIONS

Symbol	Definition
V_{BR}	Minimum Breakdown Voltage: The minimum voltage the device will exhibit at a specified current.
V_{RWM}	Working Peak Reverse Voltage: The maximum peak voltage that can be applied over the operating temperature range.
I_O	Average Rectified Output Current: Output current averaged over a full cycle with a 50 Hz or 60 Hz sine-wave input and a 180 degree conduction angle.
V_F	Maximum Forward Voltage: The maximum forward voltage the device will exhibit at a specified current.
I_R	Maximum Leakage Current: The maximum leakage current that will flow at the specified voltage and temperature.
C	Capacitance: The capacitance in pF at a frequency of 1 MHz and specified voltage.
t_{rr}	Reverse Recovery Time: The time interval between the instant the current passes through zero when changing from the forward direction to the reverse direction and a specified recovery decay point after a peak reverse current occurs.

ELECTRICAL CHARACTERISTICS

	BREAKDOWN VOLTAGE (MIN.) @ 100 µA $V_{(BR)}$	MAXIMUM FORWARD VOLTAGE @ 8.3 ms pulse V_{FM}		REVERSE CURRENT (MAX.) @ V_{RWM} I_R		SURGE CURRENT (MAX) I_{FSM} (Note 1)	REVERSE RECOVERY TIME (MAX) t_{rr} (Note 2)	THERMAL IMPEDANCE @ t_H = 10 ms $Z_{\Theta JX}$ (Note 3)
TYPE		Volts		µA				
	Volts	I_F = 1.0 A	I_F = 2.5 A	25 °C	125 °C	Amps	ns	°C/W
1N5802US & URS	60	0.875	0.975	1	175	35	25	4.0
1N5804US & URS	110	0.875	0.975	1	175	35	25	4.0
1N5806US & URS	160	0.875	0.975	1	175	35	25	4.0

NOTES: 1. T_A = 2.5 °C @ I_O = 1.0 A and V_{RWM} for ten 8.3 ms surges at 1 minute intervals (I_{FSM} surge is also a maximum rating).
2. I_F = 0.5 A, I_{RM} = 0.5 A, $I_{R(REC)}$ = .05 A (t_{rr} reverse recovery time is also a maximum rating).
3. For the complete thermal impedance curve over a broad range of heating times, see Figure 1.

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GRAPHS

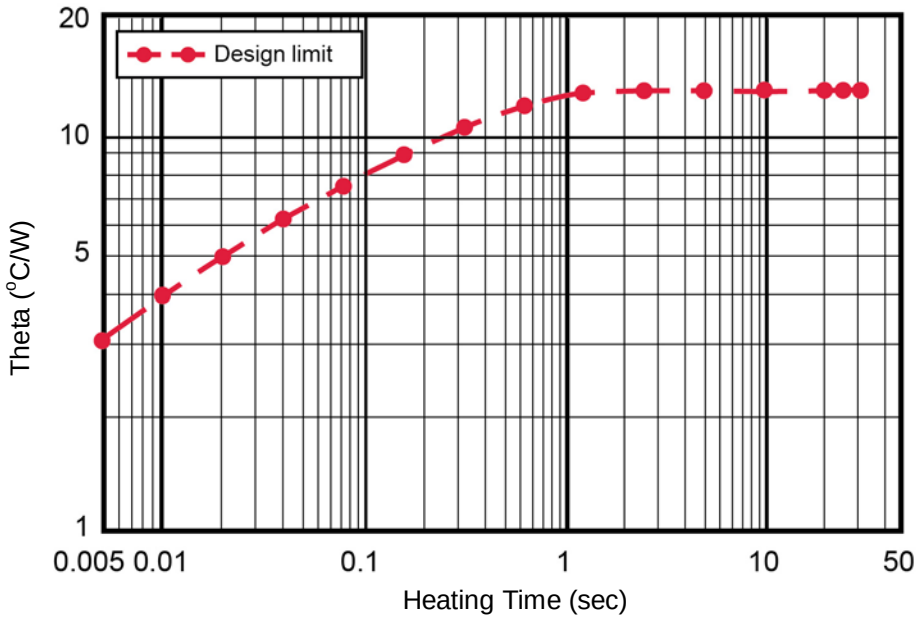

FIGURE 1
Maximum Thermal Impedance

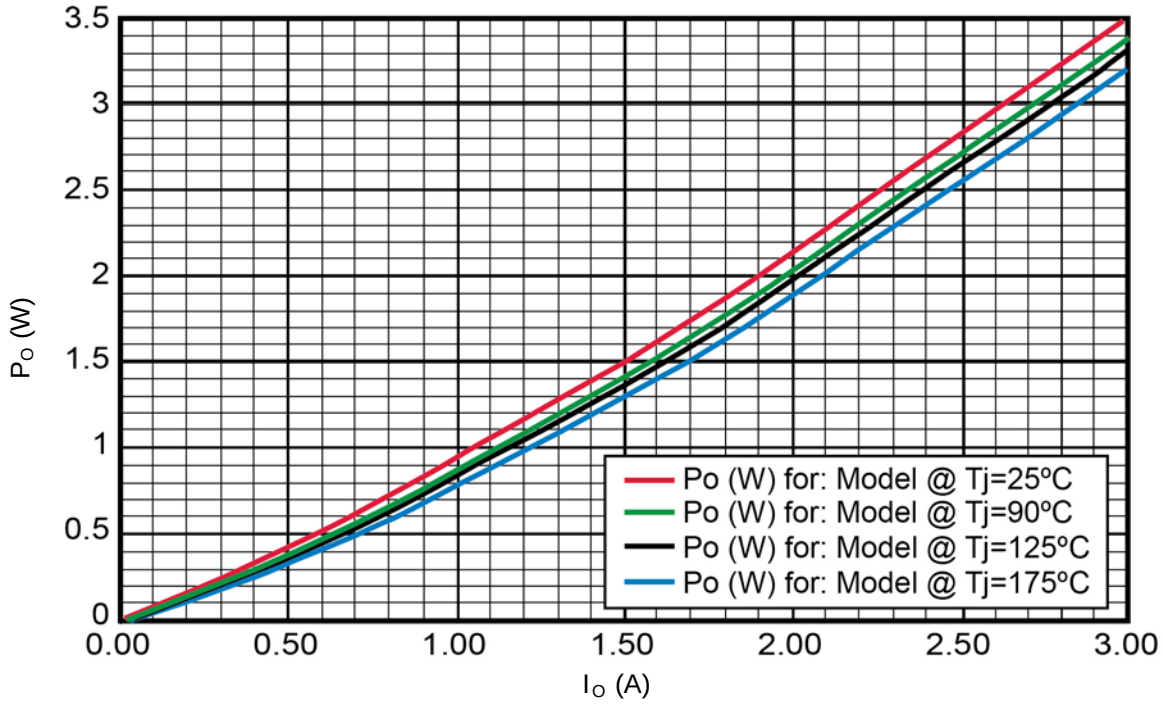

FIGURE 2
Rectifier Power Versus I_O (Average Forward Current)

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GRAPHS (continued)

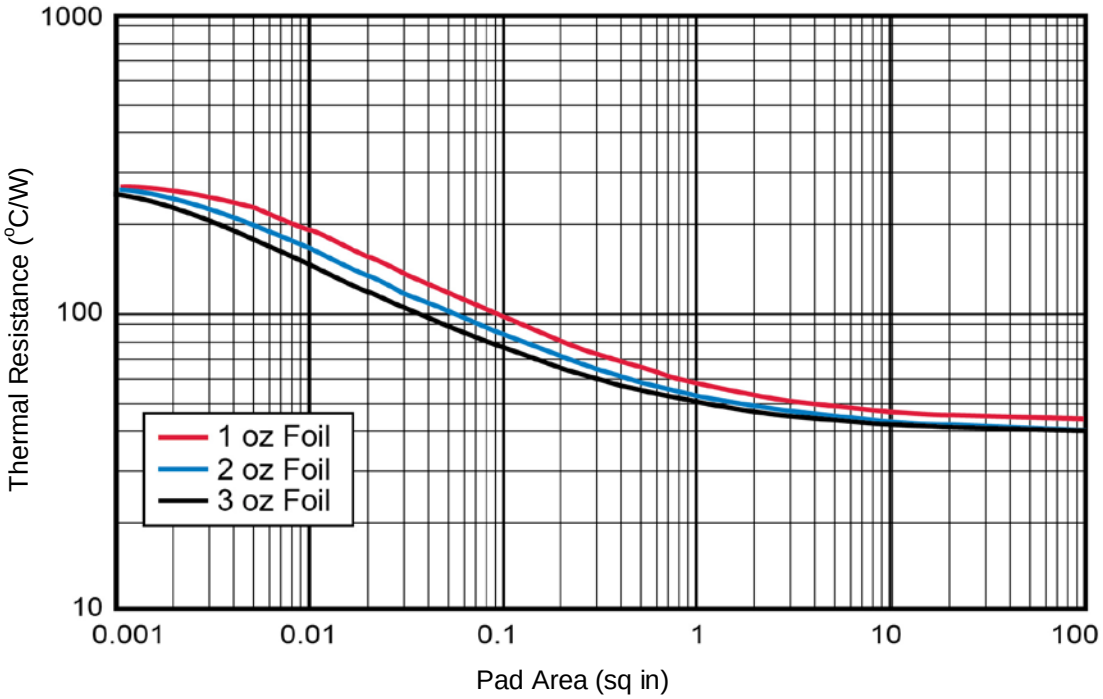

FIGURE 3

Thermal Resistance vs FR4 Pad Area At Ambient

PCB horizontal (for each pad) with 1, 2, and 3 oz copper

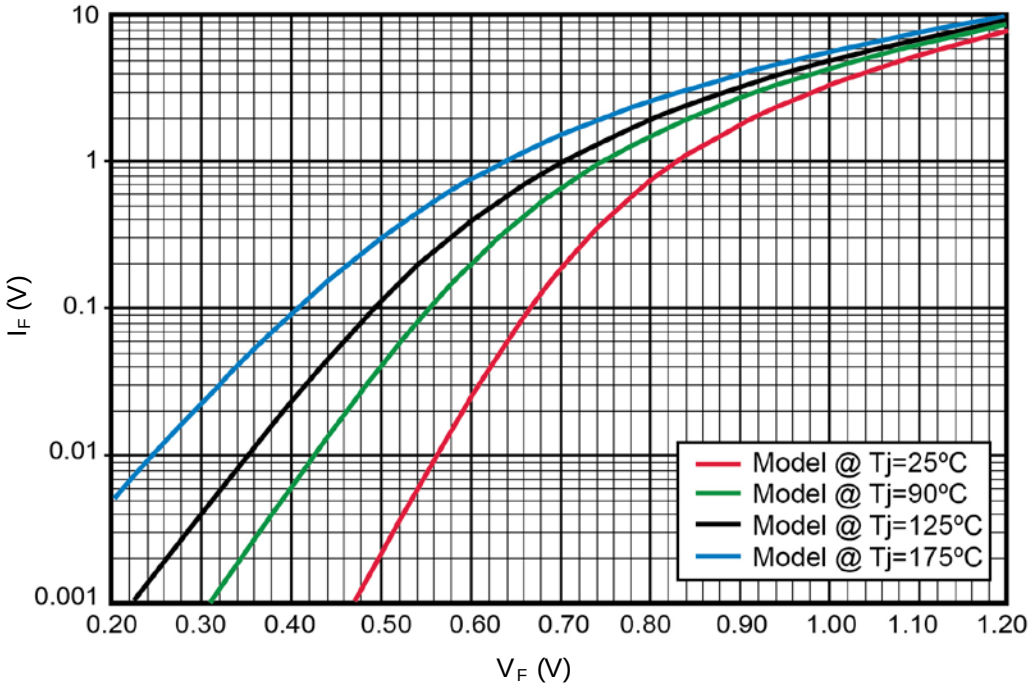

FIGURE 4

Forward Voltage vs Forward Current

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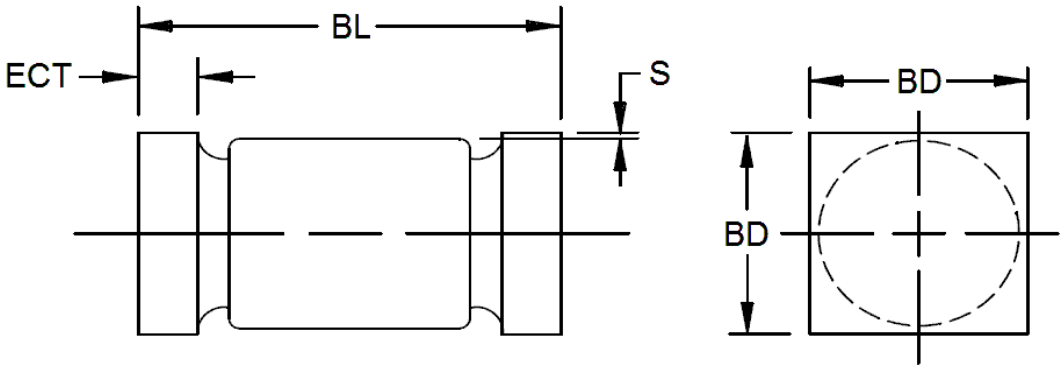
PACKAGE DIMENSIONS

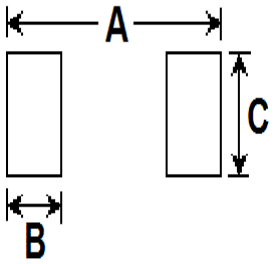


NOTES:

1. Dimensions are in inches.
2. Millimeters are given for general information only.
3. Dimensions are pre-solder dip.
4. Minimum clearance of glass body to mounting surface on all orientations.
5. Cathode marking to be either in color band, three dots spaced equally or a color dot on the face of the end tab.
6. Color dots will be .020 inch (0.51 mm) diameter minimum and those on the face of the end tab shall not lie within .020 inch (0.51 mm) of the mounting surface.
7. In accordance with ASME Y14.5M, diameters are equivalent to Φx symbology.
8. On "URS" one end cap shall be square and the other end cap shall be round.

Ltr	DIMENSIONS				Notes
	INCH		MILLIMETERS		
	Min	Max	Min	Max	
BD	.091	.103	2.31	2.62	8
BL	.168	.200	4.27	5.08	
ECT	.019	.028	0.48	0.71	8
S	.003		0.08		

PAD LAYOUT



DIM	INCH	MILLIMETERS
A	0.288	7.32
B	0.070	1.78
C	0.155	3.94

NOTE: If mounting requires adhesive separate from the solder, an additional 0.080 inch diameter contact may be placed in the center between the pads as an optional spot for cement.

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